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IS 4208 (1985): Brush, stencil [CHD 24: Brushware]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS : 4208 - 1985

Indian Standard
SPECIFICATION FOR BRUSH, STENCIL
(Second Revision)

UDC 687.979 : 681.62.061.2



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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

AMENDMENT NO. 1 SEPTEMBER 2004

TO

**IS 4208 : 1985 SPECIFICATION FOR
BRUSH, STENCIL**

(Second Revision)

(*Page 9, clause 7.1*) — Substitute 'Lindane 6.5% DP (*see* IS 14834 : 2000*) or methyl parathion 2% DP (*see* IS 8960 : 1978||) for 'DDT dusting powder (*see* IS : 564 - 1975*)'.

(*Page 9, footnote marked '*'*) — Substitute the following for the existing footnote:

*Lindane dusting powder — Specification.'

(*Page 9, footnotes*) — Insert the following footnote at the end:

||Specification for methyl parathion dusting powders.'

(CHD 24)

Indian Standard

SPECIFICATION FOR BRUSH, STENCIL

(*Second Revision*)

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(*Continued on page 2*)

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Indian Standard
SPECIFICATION FOR BRUSH, STENCIL
(Second Revision)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 7 June, 1985, after the draft finalized by the Brushware Sectional Committee had been approved by the Chemical Division Council.

0.2 This standard was first published in 1967. In the first revision, the requirements for moisture content, length of nails and ferrule and mass of bristles were modified. Test for the detection of dye in bristles and benzene alcohol test were also added.

0.3 In this revision the overall length has been replaced by length of the handle outside the ferrule, protrusion and mass of bristles has been increased. Also, inclusion of general quality of black bristles as the filling material has been specified since they are preferred by art designers or sign painters.

0.4 Brushes stencil are used for reproducing or marking with ink or paint of patterns or letters on other surfaces by use of stencils.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in the standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for brush stencil.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 5060-1969† and the following shall apply.

*Rules for rounding off numerical values (*revised*).

†Glossary of terms used in brushware industry.

2.1.1 Approved Tender Sample — The sample accepted by the indenter or inspection authority as the basis of supply.

When a sample is tested and approved by the purchaser or an inspection authority, the results of such tests as will permit the supplier to meet the limits imposed by the specification for deliveries, shall be made available to the supplier.

3. TYPES AND SIZES

3.1 Types — Stencil brushes shall be of two types, namely,

Type A — with grey bristles as filling material, and

Type B — with black bristles as filling material.

3.2 Sizes — The stencil brush shall be in 8 sizes, having the denominations as given in Table 1 read with Fig. 1.

4. REQUIREMENTS

4.1 Materials

4.1.1 Filling Materials — Semi-stiff/stiff natural grey or black bristles of general quality (conforming to IS : 1844 - 1975*) and properly straightened shall be used for the stencil brushes as filling material. The colour, lustre and stiffness of bristles used in stencil brush shall match to those used in the approved tender sample.

4.1.2 Timber

4.1.2.1 Any of the timber species listed in Appendix A shall be used in the manufacture of the wooden portion of stencil brush.

4.1.2.2 The timber shall be reasonably straight grained and well-seasoned to a moisture content not exceeding 15 percent. For routine tests, electronic moisture meter method may be used, but in case of dispute, the oven drying method shall be used (*see* Appendix B).

4.1.2.3 The timber shall be free from brushiness, any kind of biological or non-biological deterioration, insect attack, centre heart (pith), knots (except live pin knots), cracks, warp and any other defect which may reduce the life of the brush or affect its utility.

4.1.3 Ferrule — The ferrule shall be made of 0.3 ± 0.02 mm thick tinplate for sizes 2, 4, 6 and 8 and 0.38 ± 0.02 mm thick tinplate for sizes 10, 12, 14 and 16.

4.1.4 Nails — Galvanized iron nails of 1.40 mm diameter and 13 mm long shall be used.

4.1.5 Cement — Any suitable cement capable for rigid anchorage for the bunch of bristles inside the ferrule, without damaging the life of the

*Specification for bristles (*first revision*).

TABLE 1 REQUIREMENTS FOR BRUSHES STENCIL

(Clause 3.2, and Fig. 1)

SL No.	SIZE NO.	*FILLING MATERIALS		FERRULE		HANDLE LENGTH OUT OF FERRULE	MASS OF FILLING MATERIAL PER FINISHED BRUSH
		Protrusion <i>A</i> <i>Min</i>	Overall length, <i>Min</i>	Dia <i>C</i> at tapered end (Internal)	Dia <i>D</i> at larger end (Internal)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(9)
		mm	mm	mm	mm	mm	g
1	2	35	51	12	15	30	5
2	4	35	51	15	20	30	6
3	6	35	51	20	25	35	12
4	8	35	51	25	30	35	18
5	10	42	57	30	35	40	28
6	12	42	57	35	40	40	40
7	14	48	63	40	45	40	55
8	16	48	63	45	50	40	70

bristles and capable of satisfying the tests prescribed in clauses 5.1, 5.2 and 5.3 shall be used.

4.1.5.1 Vulcanized rubber setting may be used subject to agreement between the purchaser and the supplier.

4.1.5.2 In no case shall the setting appear out of the ferrule.

4.2 Dimensions and Tolerances — The brushes shall conform to the dimensions given in Table 1.

4.2.1 The tolerance on the linear dimensions shall be as follows :

<i>Nominal Dimensions</i>	<i>Tolerance</i>
mm	mm
Up to 15	± 1
Over 15 but below 40	± 2
40 and above	± 3

NOTE — A tolerance of ± 1.0 mm on the diameters of the ferrule may be allowed.

4.3 Manufacture

4.3.1 Stencil brush shall generally conform to the shape and design shown in Fig. 1.

4.3.2 The ferrule shall be hook-jointed or lapped and soldered. If lapped, the lapping shall be not less than 5 mm.

4.3.3 The bristles shall be cemented at the root-ends inside the tapered end of the ferrule for their firm setting. The brush head shall be free from loose bristles.

4.3.3.1 The face of the brush shall be of even level, as shown in Fig. 1.

4.3.4 The handle shall be tight-fit into the ferrule and secured by means of three mild steel nails placed equidistant on the circumference of the ferrule as shown in Fig. 1.

4.3.5 The solid dressing of the bristles used shall be as per approved tender sample.

4.4 Workmanship and Finish

4.4.1 The handle shall be finished smooth all over and shall be properly varnished or lacquered.

4.4.2 The ferrule shall be free from sharp edges.

4.4.3 In workmanship and finish, the brush shall match the approved tender sample.

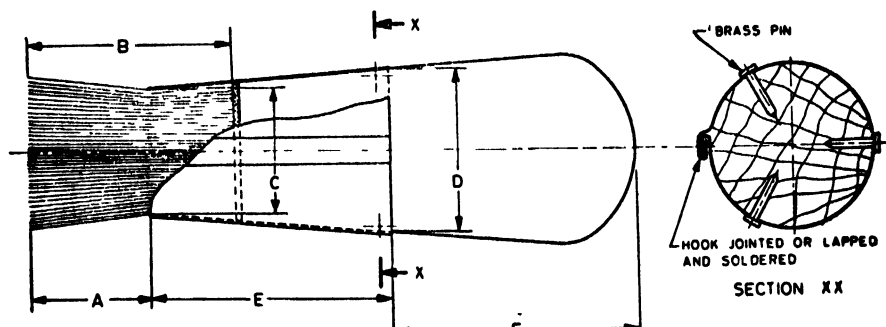


FIG. 1 BRUSH STENCIL

5. TEST METHODS

5.1 Pull Test — When a small bunch of bristles is subjected to a straight pull with thumb and finger-grip, the same shall not come out.

5.2 Benzene Alcohol Test — Immerse the bristles portion of the stencil brush for 48 h in a mixture of benzene (*see* IS : 534-1974*) and denatured spirit (*see* IS : 321-1964†), (1 : 1 by volume), maintained at room temperature in such a way that at least half of the ferrule is above the level of the solvent mixture and the bristles do not touch the bottom of the container. On completion of this test, the stencil brushes shall show no sign of loosening when used as a stencil brush for the purpose intended.

5.3 Oven Test

5.3.1 For Non-Rubber Set Brushes — The stencil brush, without handle when suspended in an oven with the protruding bristle end upward and subjected to a temperature of $60 \pm 2^\circ\text{C}$ for, shall show no appreciable creeping of the cement. Further, after cooling in air for 30 minutes, the anchorage of bristles shall not become loose inside the ferrule and the cement shall satisfy the pull test prescribed in 5.1.

5.3.2 For Robber Set Brushes — The stencil brush, without handle when suspended in an oven with the protruding bristle end upward and subjected to a temperature of $132 \pm 2^\circ\text{C}$ for 2 h, shall show no appreciable creeping of the cement. Further, after cooling the brush in air for 30 minutes, the anchorage of bristles shall not become loose inside the ferrule and the cement shall satisfy the pull test prescribed in 5.1.

*Specification for benzene (*second revision*).

†Specification for absolute alcohol (*revised*).

5.4 Mass of Bristles per Finished Brush — The mass of bristles, as determined by the method prescribed in Appendix C shall be as specified in col 9 of Table 1. A tolerance of ± 5 percent shall be allowed on the mass of the filling material provided the average mass of the filling material per stencil brush in any lot, is not below the specified value (*see also E-2.2*).

5.5 Processing of Bristles — The processing of bristles when tested by the method given in Appendix D shall be considered as satisfactory if not less than 85 percent of the bristles by mass are of categories (a) and (b) as prescribed in **D-2.2** and out of these 60 percent shall belong to category (a).

5.6 Detection of Dyed Bristles — The following two methods shall be utilized for detection of dyed bristles when tested as prescribed in Appendix C of IS : 1844-1975*.

Method A — By microscopic examination, and

Method B — By sand paper test.

5.6.1 Method A shall be referee method and Method B for routine testing.

6. MARKING

6.1 Unless otherwise agreed to between the indenter or inspection authority and the supplier, each stencil brush shall be legibly and indelibly marked or stamped with the manufacturer's name or recognized trademark, if any, the month and year of manufacture, the warranty of the bristles and the type and size of the stencil brush.

6.1.1 The rubber set stencil brushes shall, in addition to the marking specified under **6.1**, be marked on the ferrule of handle with the words 'RUBBER SET'.

6.1.2 The brushes may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors may be obtained from the Indian Standards Institution.

*Specification for bristles (*first revision*).

7. PRESERVATION

7.1 The bristles of the stencil brushes shall be liberally dusted, before packing with a mixture of 5 parts (by mass) of DDT dusting power (*see* IS : 564-1975*) and 95 percent by mass of French chalk (*see* IS : 380 1978†). Alternatively naphthalene balls (*see* IS : 539-1974‡) shall be used in the packing box for the brushes.

8. PACKING

8.1 The bristles portion of the stencil brush along with the ferrule shall be neatly covered with polyethylene or cellulose film and secured by a rubber band.

8.2 The stencil brushes shall be packed as agreed to between the indenter or inspection authority and the supplier.

9. SAMPLING

9.1 Samples — The supplier shall submit four identical stencil brushes of each size for approval.

9.1.1 The indenter or inspection authority shall retain one of the approved tender samples against each item till the completion of the order.

9.2 Sampling — The method of drawing representative samples of the brushes and the criteria for conformity shall be as prescribed in Appendix E.

10. SHELF LIFE

10.1 The stencil brushes shall have a minimum shelf life of one year, from the date of manufacture, when properly stored under shade and adequate precautions for preservations, as given under 3 of IS : 3451 (Part 1)-1978§ are taken.

APPENDIX A

(Clause 4.1.2.1)

SPECIES OF TIMBER FOR MANUFACTURE OF HANDLES

A-1. The list of species of timber approved for the manufacture of handles for stencil brushes is given below :

*Specification for DDT dusting powders (*second revision*).

†Specification for French chalk, technical (*second revision*).

‡Specification for naphthalene (*second revision*).

§Code of practice for care and maintenance of brushes: Part 1 Pan-set brushes (*first revision*).

<i>Trade Name</i>		<i>Botanical Origin</i>
Roman	देवनागरी	
aini	ऐनी	<i>Artocarpus hirsuta</i> Lamk, fam., Moraceae
banati	बनाती	<i>Lophopetalum wightianum</i> Arn., Fam., Celastraceae
bijasal	बीजसाल	<i>Pterocarpus marsupium</i> Roxb., fam. Leguminosae
champak	चम्पक	<i>Michelia champaca</i> Linn., fam. Mangoliaceae
chickrassi	चिकरासी	<i>Chukrasia tabularis</i> . A., Juss. fam. Meliaceae
dhaman	धामन	<i>Grewia tiliifolia</i> Vahl. fam. Tiliaceae
gamari (gumhar)	गमारी (गुम्हार)	<i>Gmelina arborea</i> Roxb. fam. Verbenaceae
haldu	हल्दु	<i>Adina cordifolia</i> Hook, f, fam Rubiaceae
kaim	कैम	<i>Mitrageya parvifolia</i> Roxb. Korth., syn. <i>Stephegyne pawifolia</i> Korth, Fam, Rubiaceae
kanju	काजू	<i>Holoptelea integrifolia</i> Planch., fam. Ulmaceae
kathal	कटहल	<i>Artocarpus heterophyllus</i> Lamk., syn. <i>A. integrifolius</i> Linn, f, fam. Moraceae
kodapalai	कोदपलाई	<i>Kingiodendron pinnatum</i> Harms. syn
choupaini (Piney)	चौपैनी (पिये)	<i>Hardwickia pinnata</i> Roxb. fam Leguminosae
kuthan	कुथन	<i>Hymenodictyon excelsum</i> Wall., fam. Rubiaceae
lambapatti	लम्बापत्ती	<i>Planchonella longipetiolatum</i> H. J. Lam. syn. <i>Sideroxylon longipetiolatum</i> King & Prain, fam. Sapotaceae
nim-chameli	नीम-चमेली	<i>Millingtonia hortensis</i> Linn, f, fam. Bignoniaceae
toon	तून	<i>Toona ciliata</i> Roem., syn. <i>Cedrela toona</i> Roxb. fam. Meliaceae
sisoo	सिसू	<i>Dalbergia sissoo</i>

APPENDIX B

(Clause 4.1.2.2)

DETERMINATION OF MOISTURE CONTENT OF TIMBER

B-1. TEST SPECIMEN

B-1.1 The entire block used in stencil brush may form the test specimen for determination of moisture content or a coupon cut from the test specimen may as well be used. When for any reason additional determination

of moisture content is required, separate samples shall be prepared from the sample material. Smaller specimens may be used when deemed necessary. The test shall be carried out immediately after cutting the specimen.

B-2. PROCEDURE

B-2.1 Weigh accurately each test specimen. Dry in a ventilated oven at a temperature of $105 \pm 2^\circ\text{C}$ until the mass becomes constant between the successive weighings made at an interval of not less than one hour.

B-3. CALCULATION

$$\text{Moisture content, percent by mass} = \frac{M_1 - M_o}{M_o} \times 100$$

where

M_1 = initial mass in g of the test specimen; and

M_o = oven-dry mass in g of the test specimen.

APPENDIX C

(*Clauses 5.4 and D-1.1*)

DETERMINATION OF MASS OF BRISTLES

C-0. GENERAL

C-0.1 For determining the mass of bristles in a stencil brush, they are detached by gentle hammering as described under **C-1.1**, or if the bristles are set in vulcanized rubber, by soaking in a solvent and detaching the bristles from the cement as described under **C-1.2**.

C-1. PROCEDURE

C-1.1 For Cement Other than Vulcanized Rubber — Remove all connecting pins as well as those securing the handle. Cut the ferrule right through its length on any one of the sides by means of a chisel. Open the ferrule and remove the bristles. Hammer the root ends of the bristles gently with a raw hide mallet to reduce the cement to powder and shake the bristles. Repeat this process till all traces of cement are removed. Dry the bristles in an oven at $100 \pm 2^\circ\text{C}$ for 30 minutes. Cool for 24 hours in air and weigh under prevalent atmospheric conditions.

C-1.2 For Vulcanized Rubber Setting — Open the ferrule as described under C-1.1 and remove the bristles. Soak the setting in an appropriate solvent until it is sufficiently friable to be broken down. This would normally take 12 to 18 hours. Remove the bristles from the solvent mixture and gently knead between the fingers so as to separate the bristles from the block into which they are mounted, but taking care that no undue force is used which may break the bristles. Repeat this process until the bristles are free from vulcanized rubber setting. Dry the bristles in an oven at $100 \pm 2^{\circ}\text{C}$ for 30 minutes. Cool for 24 hours in air and weigh under prevalent atmospheric conditions.

NOTE — Trichlorethylene is a suitable solvent for rubber and pitch settings, and acetone for synthetic resin settings.

APPENDIX D

(Clause 5.5)

TEST FOR PROCESSING OF BRISTLES

D-0. GENERAL

D-0.1 The object of this test is to determine whether the processing of the bristles for elimination of their natural tendency to curve, has been adequate or not.

D-1. TEST SAMPLE

D-1.1 A bunch of bristles, freed from cement as prescribed under Appendix C and consisting of at least 10 percent of the total mass of the filling material of the brush, shall constitute the test sample.

D-2. PROCEDURE

D-2.1 Tie the test sample of the filling material with thread of linen tape at one end and suspend it in water maintained at $70 \pm 2^{\circ}\text{C}$ for 10 minutes. Remove the bristles from the water and shake to remove as much water as possible. Untie the knot and spread out all the bristles on a large sheet of blotting paper in a warm place. Allow to dry at room temperature for 48 hours.

D-2.2 The bristles shall then be examined and categorized as given below :

- a) bristles which are straight;
- b) bristles which have a curvature whose radius is 230 mm or more (see Fig. 2), and
- c) the remainder.

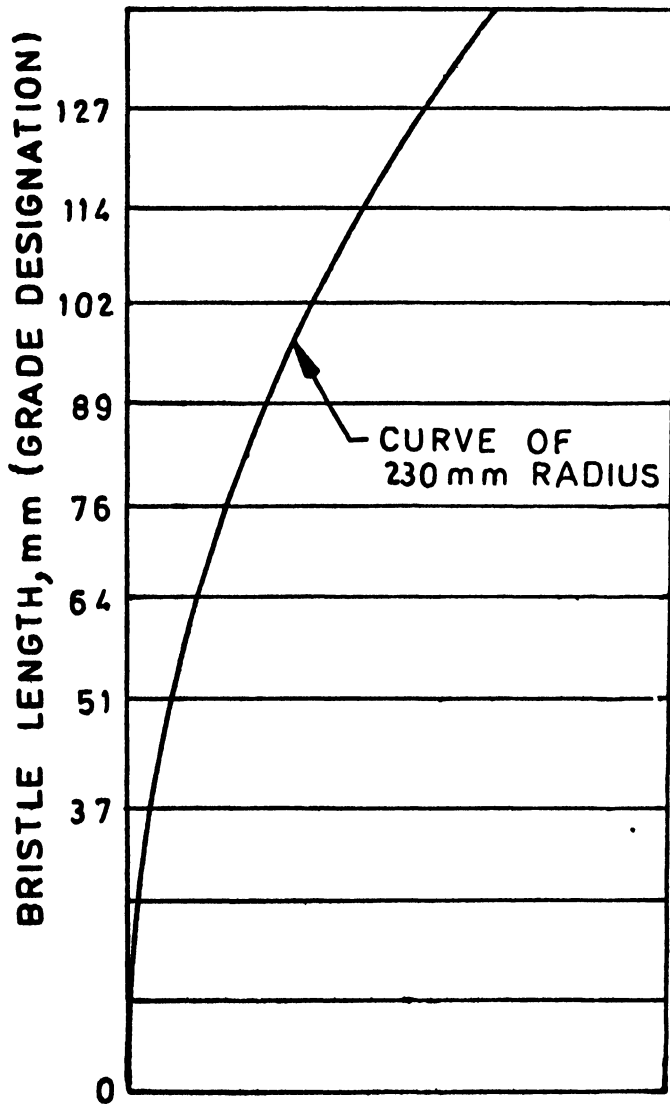


FIG. 2 PERMISSIBLE CURVATURE FOR DIFFERENT BRISTLES LENGTH

APPENDIX E

(Clause 9.2)

SAMPLING AND CRITERIA FOR CONFORMITY

E-1. SCALE OF SAMPLING

E-1.1 Lot — In any consignment, all the stencil brushes of same size, same type, similar dimensions and manufactured from the same type of material, shall be divided into groups of 1 000 and each group shall constitute a lot. Care shall be taken to ensure that stencil brushes included in a lot do not differ in construction, as far as possible.

E-1.2 For ascertaining the conformity of the stencil brushes to the requirements of this specification, sample shall be tested from each lot separately.

E-1.3 The number of stencil brushes to be selected from a lot shall depend on the size of the lot and shall be in accordance with col 1 and 2 of Table 2.

TABLE 2 SCALE OF SAMPLING AND PERMISSIBLE NUMBER OF DEFECTIVES

No. OF STENCIL BRUSHES IN THE LOT	NO. OF STENCIL BRUSHES TO BE SELECTED	PERMISSIBLE NO. OF DEFECTIVE STENCIL BRUSHES
(1)	(2)	(3)
Up to 25	3	0
26 „ 100	5	0
101 „ 300	7	0
301 „ 500	9	0
501 „ 1 000	13	1

E-1.3.1 These stencil brushes shall be selected at random from the top, middle and bottom of the box, if the brushes are packed in only one box. If the stencil brushes in a lot are packed in more than one box, at least 20 percent of the boxes, subject to a minimum of two shall be selected and approximately equal number of stencil brushes shall be taken from each box, so as to constitute the required sample size given in col 2 of Table 2. In order to ensure the randomness of selection, procedures given in IS : 4905-1968* may be followed.

*Methods for random sampling.

E-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

E-2.1 All the stencil brushes selected according to **E-1.3** shall be examined for constructional requirements given in **4** and Fig. 1. A stencil brush failing in one or more of these requirements shall be considered as defective.

E-2.1.1 The lot shall be declared as conforming to these requirements if the number of defectives found in the sample is less than or equal to the permissible number of defectives given in col 3 of Table 2.

E-2.2 The lot having been found satisfactory according to **E-2.1.1** shall further be subjected to tests given under **5**. For this purpose, three stencil brushes shall be selected from a lot containing 500 or less stencil brushes and six stencil brushes from a lot containing more than 500 stencil brushes. These stencil brushes may, however, be taken from those already examined and found satisfactory according to **E-2.1**.

E-2.2.1 Pull test, benzene alcohol test and oven test shall be performed first, on each of the brushes selected according to **E-2.2** and then these stencil brushes shall be subjected to mass of bristles per finished stencil brush, processing of bristles and detection of dried stencil brushes in this order, according to methods given in **5.4**, **5.5** and **5.6** respectively.

E-2.2.2 The lot shall be deemed to have met the requirements for these tests if no failure occurs under **E-2.2**; otherwise not.

E-2.3 The lot shall be declared as conforming to the requirements of this specification if **E-2.1**, and **E-2.2** are satisfied.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>	<i>Definition</i>
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²



INDIAN STANDARDS INSTITUTION

Headquarters:

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Telegrams : Manaksanstha
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Regional Offices:

Telephone

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BOMBAY 400093

†Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, 36 24 99
Maniktola, CALCUTTA 700054

Southern : C. I. T. Campus, MADRAS 600113 41 24 42

Northern : B69 Phase VII, Industrial Focal Point, 8 73 28
S. A. S. NAGAR 160051 (Punjab)

Branch Offices:

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BANGALORE 560002

Gangotri Complex, Bhadbhada Road, T. T. Nagar, 6 27 16
BHOPAL 462003

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5-8-56C L. N. Gupta Marg, HYDERABAD 500001 22 10 83

R14 Yudhister Marg, C Scheme, JAIPUR 302005 6 98 32

117/418 B Sarvodaya Nagar, KANPUR 208005 4 72 92

Patliputra Industrial Estate, PATNA 800013 6 23 05

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TRIVANDRUM 895001

Inspection Office (With Sale Point) :

Institution of Engineers (India) Building, 1332 Shivaji Nagar, 5 24 35
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